B.Tech. Final Year Project (2019-2023)

Zeroth Review Report

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Group No: 8

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Title:
Cellular Automata and Algorithmic Preprocessing to Improve Clustering

Introduction:
Clustering is crucial because it determines the intrinsic grouping of the unlabeled data present. For instance, we might be interested in locating homogeneous group representatives (data reduction), identifying unknown properties of natural clusters and describing them as natural data types, identifying appropriate and functional groupings, or identifying unusual data objects (outlier detection).

Scope:
Some current design challenges include finding a proper hash function without losing important data or features, lowering the amount of the data by feature reduction, compression, and other techniques, and choosing an effective algorithm from a list of reversible cellular automata.
We take a non-conventional approach towards clustering, by grouping similar data points based on the rule and cycle formation using cellular automata, and improving this process through algorithmic preprocessing. Utilizing cellular automata, we pre-process the data and eliminate any extraneous features from the clustering algorithm before tackling the challenge of enhancing clustering. Then, we determine the suitable hash functions for entities that need clustering to be positioned in different cells during the initial approach. We then propose a new algorithm that avoids the randomized search for rules for a particular dataset, suggests appropriate rules for the dataset, and uses them for clustering. We also aim to package the whole process for ease of replication and development. Avoiding randomized search will reduce the time taken to cluster and optimize the whole process for any given dataset.

(Ganta Sneha Rao)(Subramanian V V)(Viswonathan Manoranjan) (Dr. Kamalika Bhattacharjee)
Signature of Students   **Signature of Guide**